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ABSTRACT

As a result of the recent growth in the telecommunications industry, most notably the rapid development of cable television, attention is being drawn to the need for qualified personnel in the field. This report analyzes the need in New Jersey for personnel both in the telecommunications industry generally and in cable specifically. As background for the labor market analysis, recent trends in cable development, possible futures for the field, and general categories of jobs available within the industry are reviewed. This is followed by an analysis of specific manpower needs, based principally upon the results of statewide employment surveys and supplemented by a review of current publications, as well as extensive interviews with local and national experts. An analysis of the need for educational programs in the state, with respect to both specific manpower needs and the appropriate fit between the skills and knowledge required and the level of education provided, is then presented. Finally, the high start-up and maintenance costs of such programs are detailed. It is concluded that the need for qualified personnel will grow at a rapid pace in the foreseeable future. Several recommendations are offered, such as: (1) a maximum of three educational programs in telecommunications should be developed at the associate degree level in New Jersey as soon as feasible; (2) due to the high costs of such programs, only schools already equipped should establish such programs; (3) the proposed programs should be developed to provide students with marketable skills in a rapidly changing market; and (4) no additional educational programs should be offered in telecommunications at the community college level prior to the completion of follow-up studies of the first cohorts of graduates of the three recommended programs. The appendix includes the employment survey instruments and covering memoranda. (Author/LC)

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OPM Volume 1: Report Number 6

Telecommunications :

A Labor Market Analysis

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NEW JERSEY DEPARTMENT OF HIGHER EDUCATION

JUNE 1981

NJ MANPOWER PLANNING SERIES

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Prepared by:
Phyllis Denbo

I. Summary and Recommendations

As a result of the recent growth in the telecommunications industry, most notably the rapid development of cable television, attention is being drawn to the need for qualified personnel in the field. Questions arise with respect to the types of employees in greatest demand, the appropriate content and level of education for these persons, the need to establish postsecondary programs to provide this education, and whether such programs should be designed to serve regional needs.

This report analyzes the need in New Jersey for personnel both in the telecommunications industry generally and in cable specifically. In fact, because the most significant growth has been in cable, attention is focused largely on the supply of and demand for employees in that sector of the telecommunications industry. As background for the labor market analysis, this report first reviews recent trends in cable development, explores the possible future of the field, and summarizes general categories of jobs available within the industry. This is followed by an analysis of specific manpower needs, based principally upon the results of state-wide employment surveys and supplemented by a review of current publications, as well as extensive interviews with local and national experts. An analysis of the need for educational programs in the State, with respect to both the specific manpower needs identified and the appropriate fit between the skills and knowledge required and the level of education provided, is then presented. Finally, because the need for programs is addressed in terms of the potential for developing new programs on a regional basis, the high start-up and maintenance costs of such programs are detailed.

Based upon the findings of the study, it is estimated that the need for qualified personnel, particularly at the technical level, will grow at a rapid pace for the foreseeable future. New Jersey cable companies alone anticipate a need for approximately 325 additional technically trained personnel in the next two to five years. Radio and television broadcast studios anticipate the need for an additional 130 technical employees during the same period. Although specific data on employment needs in related facilities are not available, many large companies in the State have extensive on-site telecommunications facilities for the purpose of producing programs for employee training and general marketing.

Several precautions should be noted. First, any figures on anticipated personnel needs in telecommunciations are essentially rough estimates, due to the highly speculative future of the industry. Changes are occurring far too rapidly to develop projections with any real precision. Moreover, there are no generally accepted guidelines regarding the level of education necessary for most industry employees. In fact, approximately three-quarters of the technical level personnel presently employed by cable companies in New Jersey received their training on-the-job. This may be attributable in large part to the fact that the development of educational programs has not kept pace with the rapid growth in job opportunities. On the other hand, it is likely that many technical positions are and will continue to be filled by <u>qualified</u> persons with less than a formal two-year postsecondary education. Finally, to initiate educational programs in telecommunications is extremely costly. A modestly equipped transmission studio may run as high as half a million dollars, and the essentials of an electronics laboratory can easily cost over a hundred thousand dollars. To maintain and update this equipment is also expensive. For these reasons, the following recommendations are made:

1. A maximum of three educational programs in telecommunications should be developed at the associate degree level in New Jersey as soon as feasible. These programs should be regional in scope and distributed equitably across New Jersey, i.e., one program each should be located in the northern, central, and southern areas of the State. Each program should be designed initially to graduate a maximum of forty students per year.

2. Due to the high cost of developing such programs, only schools with existing capabilities, i.e., equipped studios and electronics laboratories, should be encouraged to establish programs.

3. Because the ability of graduates to obtain jobs will be directly related to the scope and substance of their educational background, the proposed programs should be designed to provide students with marketable skills in a rapidly changing industry. The programs should be technologically oriented with a strong sequence of electronics courses. Although the technological skills taught should be broadly applicable to both cable and broadcast facilities, the majority of program graduates are likely to find employment in cable television. Therefore, emphasis should be placed on preparation for employment in this field, including hands-on experience in the form of internships in actual job settings. Courses in data processing, marketing, and management should also be available. Curricular flexibility is essential, as technological advances within the industry are occurring very rapidly.

4. No additional educational programs should be offered in telecommunications at the community college level prior to the completion of follow-up studies of the first cohorts of graduates of the three recommended programs. These studies should include statistics on job placement, as well as an analysis of the relationship between the educational preparation of the graduates and their subsequent employment.

II. Introduction

This study was undertaken to determine the advisability of developing postsecondary educational programs in the field of telecommunications on a regionalized basis. The telecommunications industry has experienced extremely rapid growth in the past decade. In fact, employment needs, particularly in cable television, have outstripped the development of training programs for qualified technical personnel. Due to expansion of the telecommunications job market, technological innovations in the industry, and the high cost of equipment necessary for both training and service delivery, a labor market analysis in telecommunications was deemed necessary to determine the need for establishing formal educational programs in the field.

In the present era of increased economic constraints, declining (or at best stable) student enrollments, and rapid technological advances, the designation of regional academic programs (i.e. to serve students from a wider geographic area than traditionally served by a given institution) is an important function of state level educational planning. The principal objective of regionalization is the development of a limited number of high quality programs, particularly in technical level community college programs, in a cost effective manner. The criteria for identifying occupational fields in which regional programs should be developed include high start-up and operating costs, an uncertain or rapidly expanding job market, and/or the emerging nature of a given field. Because telecommunications meets all three criteria, the present study was designed to address the following questions:

1. What are the employment implications of the current and anticipated growth in the telecommunications industry?

2. Is there a need for formal regionalized educational programs in New Jersey to prepare qualified personnel for employment in the field?

3. If there is a need for such educational programs in the State, what would be the appropriate academic level, substantive focus, number and geographic location of these programs?

To answer these questions, the following data collection activities were undertaken:

1. Current supply and demand information for specific occupational categories was collected from surveys developed by the Office of Research and Manpower (ORM) and distributed to all cable television companies and radio and television broadcast stations in the State. Questions were asked on the total number of employees; the number of technical employees by specific job title; the number of vacant technical positions by job title; the number of anticipated available positions in two and five years; the highest level of training for current employees in specific technical positions; and the perceived need for graduates of possible two year college programs in telecommunications. The survey activities had the full support of the New Jersey Office of Cable Television and the New Jersey Broadcasters Association. (See Appendix for copies of surveys and letters of organizational support.)

2. To supplement these data, open-ended telephone interviews were conducted with the directors of six New Jersey cable companies, both large and small, rural and urban.[1] Each director was requested to speculate about the future directions of the industry in New Jersey and their employment implications, as well as to assess the potential need for and appropriate content of two-year degree programs in telecommunications. An important purpose of these

(1) Included were Robert Bilodeau, Suburban Cable; Gary Cutro, Vision Cable; Hank Magers, UA Columbia; Cliff Paul, Garden State CATV; George Ring, Cross Country Cable; and Barbara Silkworth, Storer-Eatontown.

interviews was to extend the scope of the labor market analysis beyond the strictly technical job categories covered in the surveys.

3. At the national level, information on job trends was gathered from the National Association of Cable Television, a review of current periodicals in the field of telecommunications, and lengthy discussions with the director of the one associate degree granting cable telecommunications program in the northeastern United States (Middlesex County College in Connecticut).

III. The Telecommunications Industry

This section reviews recent trends and anticipated growth in the cable industry. Once again it should be stressed that while technological advances in other areas of telecommunications are occurring at a rapid pace, the most significant growth in terms of the delivery of services has been in cable, and this trend is likely to continue for at least the foreseeable future. The increase in cable services has been accompanied by a notable rise in the number of employees in the industry, as well as the demand for additional personnel. Employment trends in the broadcast sector are in marked contrast to the market for cable employees. For example, the most recent Occupational Outlook Handbook points out that competition in the broadcasting industry will be "very keen...because this field traditionally attracts large numbers of job seekers."(2)

The national statistics on growth of the cable industry are impressive. According to a recent article in Business Week,(3) the number of television homes which have cable has grown from 5% (2.8 million) in 1968 to almost 20% (14 million) in 1980. The cable television industry's apparent desire to "plug in" has resulted in intense competition among major companies for local

(2)U.S. Department of Labor, 1981, p.582.

(3)December 8, 1980, p.62.

franchises. For example, the same article reported that nine companies had spent an estimated $250,000 each in bidding for cable rights in several wealthy Connecticut communities.

In the last few years, the New Jersey cable industry has been growing approximately three times faster than the national rate. Since 1978 the number of subscribers has increased by 75%. There are presently 54 cable companies in operation in 21 counties. This growth has been reflected in employment statistics. In 1974, there were 436 employees in cable television in New Jersey. This number had increased by 136% to 1,027 employees in 1979. While data are not available on the annual rates of employment growth during that five year period, it is reasonable to assume that they were rising steadily. In fact, during 1980 the rate of employment grew by an additional 34%.(4)

Furthermore, it is anticipated by every cable company director contacted that this growth will continue unabated for the foreseeable future due to increases in both the number of subscribers and the services which the systems will be capable of delivering. One director interviewed, for example, estimated that the number of subscribers will double in New Jersey over the next three years. In addition, all of the interviewees predicted rapid growth in the number of services offered via cable. It is assumed that most systems will increase their channel capacity well beyond the twelve channels traditionally available and that there will be a proliferation of satellite systems. In addition, the marketability of two-way interactive systems, e.g. for security systems and data retrieval, is being explored, although projections of significant growth in this area, particularly for the next few years, must be viewed with caution. Two-way systems are

(4) These figures are from the October 1, 1980 issue of Cable Facts, prepared and distributed by the New Jersey Office of Cable Television.

extremely costly to develop, and according to one company director, their profitability has not yet been proven. For example, where the existing systems are old and densely distributed, they would have to be torn down and rebuilt completely for bi-directional capability. A second director estimates that it may be at least ten years before major companies start offering these services. It should be noted, however, that as local franchises come up for renewal (many within the next five years), individual communities will be in a position to demand new services of their affiliated cable companies, which, in turn, may either provide the services or lose their franchise rights to competitors.

While the rate of expansion within the cable industry cannot be projected with certainty, the fact that system capabilities and related services will grow would appear to be indisputable. Moreover, the employment market is likely to continue to reflect this growth in terms of both the number and variety of positions. A publication recently released by the National Association of Cable Television lists four broad areas of potential employment in the industry: franchising, construction, operation, and production. In each of these areas, there are job titles at the technical level, in research, in marketing, and in management. However, questions must be asked regarding the need for specific job categories, in New Jersey particularly, and the appropriate level of training for these categories.

IV. An Analysis of the Need for Telecommunications Personnel

In a traditional manpower needs assessment, the supply of and demand for qualified personnel are analyzed separately. Need is then determined based upon the difference between the two. However, in an industry as diverse and dynamic as telecommunications, in which there are neither clear

guidelines with respect to job qualifications (e.g., established credentials in terms of education or job experience) nor uniformity across companies with respect to job titles, assessing the current supply of manpower is extremely difficult. Thus, estimates of need must be based upon the best judgement of persons actively involved in the field.

The principal sources of data on personnel resources in telecommunications are the employment surveys of cable companies and broadcast stations designed and distributed by the Office of Research and Manpower. Before reviewing these data, however, two important caveats must be noted. First, in a relatively new and/or rapidly growing industry such as this, it is not possible to identify all of the potential sources of employment, let alone survey them. In addition, it is difficult to determine whether the survey returns are consistent with respect to the designated positions among all of the companies responding. As the National Association for Cable Television found in developing a job seekers manual, job titles are not uniform throughout the industry.

Nevertheless, the data presented in Tables 1 and 2 clearly indicate a current and anticipated need for various technical level personnel in all areas of the State.* Specifically, there is a current need expressed by New Jersey's cable companies for approximately 80 servicemen and technicians, and an anticipated need in two to five years for approximately 325 additional employees in these two positions. Based on information obtained from the surveys and interviews, both servicemen and technicians should have some form of advanced technical training. While there are no generally accepted educational standards with respect to length, scope, or institutional setting for any of these positions, more sophisticated skills are generally

*The survey response rate of cable companies was 78% and of broadcast companies, 53%. All figures on Table 1 and 2 have been adjusted for a 100% response rate.

Table 1

Anticipated Need for Technical Level Employees
New Jersey Cable Companies
January 1981

Positions by Region of State	Current Full-time Employees	Current Part-time Employees	Current Positions Available	Anticipated Additional Personnel 2 & 5 Years
Northern [1]				
Servicemen	174	8	19	112
Technicians	125	8	21	40
Installers	72	7	18	67
Other [2]	96	21	8	34
Central [3]				
Servicemen	42	0	5	49
Technicians	44	1	5	37
Installers	64	3	11	28
Other	45	12	0	8
Southern [4]				
Servicemen	46	0	10	58
Technicians	46	8	21	30
Installers	58	0	11	39
Other	28	7	5	34
STATE TOTALS				
Servicemen	262	8	34	219
Technicians	215	17	47	107
Installers	194	10	40	134
Other	169	40	13	76

1 Includes Bergen, Essex, Hudson, Morris, Passaic, Sussex, Union, and Warren Counties.
2 Includes production staff, sales and marketing, dispatchers, and construction workers. The large variety of responses prevented their being grouped into general categories.
3 Includes Hunterdon, Mercer, Middlesex, Monmouth, Ocean, and Somerset Counties.
4 Includes Atlantic, Burlington, Camden, Cape May, Cumberland, Gloucester, and Salem Counties.

Table 2

Anticipated Statewide Needs for Technical Level Employees[1]
New Jersey Broadcast Stations
January 1981

Job Categories	Current Full-time Employees	Current Part-time Employees	Current Positions Available	Anticipated Additional Personnel 2 & 5 Years
1st Class Engineers	138	34	54	52
Technicians	188	40	32	80
Board Operators	22	36	4	0
Studio Personnel	16	6	0	0
Disc Jockeys	36	20	0	4
Other	0	0	0	0

1 Due to inconsistent response rates among the counties within the State, it is impossible to present meaningful regional (northern, central and southern) totals.

required of technicians than of servicemen, although both may be called upon for complicated troubleshooting jobs. The most highly skilled workers become bench technicians, systems technicians and/or chief technicians. Installers were also included in the survey to provide an overview of the general composition of technical level personnel in the cable facilities, but these workers require only limited training, certainly not in an academic setting.

In contrast to the cable facilities, anticipated employment in broadcasting is more limited. While there are currently approximately 80 vacant positions for 1st class engineers and technicians, the need for additional personnel in these categories over the next five years is about 130, or approximately one-third the labor market demand in the cable industry. Another interesting source of new employment opportunities in telecommunications is major industry, i.e., a number of large companies are currently developing on-site audiovisual capabilities for the purpose of producing programs for staff training and general marketing. Bell Telephone of New Jersey in Holmdel, for example, has extensive facilities. (A survey of these potential employers was not deemed feasible, due to the difficulty in developing adequate sampling techniques in light of the diversity of the companies. Nevertheless, their potential as employers should not be overlooked.)

The survey findings of a growing demand for higher level technical personnel in the cable industry are corroborated at the anecdotal level by the number of job advertisements for these individuals in numerous current trade periodicals, as well as by the majority of the New Jersey cable directors interviewed. In addition, several of the directors concluded that there would be a growing need for other types of sophisticated

personnel in cable, e.g., for management, marketing and advertising. It should be pointed out, however, that two of the directors took exception to these estimates, claiming instead that the job market may be somewhat limited at the higher levels. Because these directors defined cable as "primarily a trade oriented field," they questioned whether providing many workers with advanced technical training might not create a surplus of supervisory personnel. Therefore, it seems reasonable to exercise caution in the development of formal educational programs to prepare skilled workers for the telecommunications industry. The next section reviews the feasibility of developing such programs.

V. Educational Programs

There are no postsecondary institutions in New Jersey currently offering technical level degree granting programs in telecommunications, although a number of community colleges presently offer individual courses or clusters courses in the field. In considering the development of formal educational programs in telecommunication in the State, the first question to be asked is whether there is a need for such programs. As Table 3 indicates, approximately 75% of the present cable communications technical employees have been trained on-the-job. Only the production staff, where employment needs appear to be limited,* account for any earned baccalaureate degrees, and, even in this area, more than 50% of the employees were trained on-the-job. The lack of formal training of cable workers, however, may be due largely to the rapid growth in the industry which has outpaced the development of educational programs. Many of the

*One cable director said that he has hundreds of job applications for production staff and very few for technical workers.

Table 3

Highest Level of Education of Technical Employees
New Jersey Cable Companies and Broadcast Stations
January 1981

Job Title	Level of Education: On the Job Training	Customized Vocational Training (max. 6 mos.)	1 Yr. Certificate Program	Associate Degree	Baccalaureate Degree	Total
Cable Companies						
Installers	136	19	12	-	-	167
Servicemen	112	20	4	1	-	137
Technicians	70	16	7	14	-	107
Production Staff	23	1	-	1	15	40
Others	46	6	-	6	-	50
TOTAL	387	62	23	22	15	501
Broadcast Stations						
1st Class Engineers	20	13	25	7	16	81
Technicians	85	95	3	9	15	207
Studio Staff	2	-	-	-	-	2
Board Operators	11	-	-	-	12	23
Disc Jockeys	-	-	-	-	4	4
Others	-	-	-	-	4	4
TOTAL	118	108	28	16	51	321

companies, in fact, have been forced to hire graduates of short-term training programs offered by proprietary schools of questionable quality. Both survey respondents and company directors indicated frequent dissatisfaction with these employees. In contrast to cable personnel, on-the-job training has been acquired by only about one-third of broadcast personnel, and baccalaureate degreed technicians are somewhat more common in broadcasting. This may be another indication of the greater competition for jobs in the latter field.

The fact that there are a limited number of persons with formal education in cable telecommunications does not necessarily indicate a lack of need for such programs. The experience of the one associate degree program in cable telecommunications offered in the northeast provides partial evidence of the demand for formally trained personnel. The program at Middlesex Community College in Connecticut was established in 1974. According to its director, the market could absorb far more than the thirty students which the program is currently capable of educating. In fact, many of the students never graduate, because they are hired by the industry while still enrolled in the program. While the program focuses heavily upon electronics, courses are also provided in graphics, data processing, and marketing, as well as mathematics and composition. Students also participate in an eight hour weekly practicum, with placement dependent upon the student's long term career goals. Graduates (and non-graduates) have entered many facets of the industry, with marketing apparently the most financially rewarding.

As previously noted, there is no universal agreement regarding the education or job experience necessary to prepare people for employment in the telecommunications industry. For example, a job seekers manual

recently prepared by the National Cable Television Association does not specify a degree for any technical workers other than chief engineers, although electronics training and hands-on experience are recommended for all technicians. Nevertheless, based upon the recent and projected growth in cable in New Jersey and upon the limited experience of Middlesex County College, it is reasonable to expect that graduates of a limited number of technologically oriented associate degree granting programs in the State similar to the one in Connecticut will have little difficulty obtaining employment. One cable company director, for example, stated that once cable systems are installed statewide, there will be an increasing need for "troubleshooters" with sophisticated electronics skills. A second company director indicated that many of the present technical employees are, "unfortunately", just mechanics, capable of performing by rote but with no theoretical understanding of what to do. And a third director envisions that recent graduates of associate degree programs will be prepared to enter in-house management training programs.

With respect to manpower needs, the ORM survey results previously noted (See Tables 1 and 2 above) indicate anticipated openings for approximately 455 technical personnel, 325 servicemen and technicians in cable companies and 130 first class engineers and technicians in broadcast stations, throughout New Jersey over the next five years. However, not all of these positions need be filled by graduates of two year technical programs. In fact, responses to the surveys and telephone interviews indicate that many, if not most, of the approximately 220 anticipated positions for servicemen may be filled by qualified workers with less than a two year postsecondary education, resulting in a need by cable companies and broadcast stations for a <u>minimum</u> of 235 personnel trained

at the associate degree level over the next five years. This figure, however, does not account for total needs in the field. An additional, unspecified number of program graduates are likely to find employment in such related facilities as self-contained video studios in large companies.

Another important consideration in the development of regionalized community college programs in telecommunications is cost. Equipment requirements for such programs are extensive and expensive. At the very least, students should have access to an up-to-date electronics laboratory, as well as hands-on experience in a video transmission studio. A basic, well-equipped laboratory includes power supplies, an oscilloscope, wave form monitors, spectrum analyzers, etc. The cost of such a facility has been estimated at over $100,000. In addition, cable-specific electronics equipment, such as modulators, generators, and amplifiers, as well as an earth station, may run an additional $50,000 to $75,000. While in-depth production experience is not necessary for students preparing for jobs as technicians, some exposure to a transmission studio is important. A moderately equipped facility, including cameras, videotape, microwave, and distribution systems, may easily cost as much as $500,000. Added to these basic costs are regular maintenance and updating expenditures, which have been conservatively estimated at $15,000 annually. It is important to note that a number of community colleges have electronics and studio facilities. Given the cost of these facilities, the most efficient and effective method of program development would be to permit only those institutions with existing capabilities to offer degree granting programs in telecommunications.

Based on the statewide distribution of personnel needs in the telecommunications industry, the rapid technological advances in the field, and the extensive cost considerations, the development of three regionalized associate degree granting programs designed to graduate approximately forty students each per year, is likely to serve the educational needs of the State for at least the next five years. Thus, assuming the programs begin accepting students in either the fall of 1981 or 1982, in five years there would be a maximum of 360 program graduates. Based upon the standard in-state retention rate for community college graduates, approximately 80% (or 288) of these graduates would seek employment in New Jersey in either the facilities surveyed or related settings. Thus, five year projected labor market needs would be met. While it is not possible to project demand with any degree of precision beyond the five years, preliminary indications based upon the research conducted for this study are that subsequent growth in the cable industry is likely to meet or exceed previous growth. Follow-up studies of the graduates of the initial programs, including the kinds of jobs obtained and their relationship to the educational programs completed, might then serve as the basis for the approval of additional programs, as well as changes in existing ones.

VI. Recommendations

To analyze the need for educational programs in telecommunications in New Jersey, employment surveys of cable companies and broadcast stations in the State were conducted, directors of selected cable companies were interviewed, and national experts in the field were contacted. It was determined that extremely rapid growth is occurring in the cable industry.

This is reflected in the employment market, most notably in the need for technical level personnel. An additional growth area is major industry, as numerous large companies are developing on-site audiovisual capabilities for training and marketing purposes. While personnel vacancies have also been identified in broadcast facilities, needs are somewhat limited due to slower growth and intense competition for jobs.

It must be emphasized, however, that there are no clear guidelines regarding job qualifications, i.e., the appropriate scope, level, and institutional setting of training for specific job titles, due to the diverse and dynamic nature of the industry. Most people currently employed in telecommunications, in fact, have received their technical training on-the-job. While this may be due in part to the fact that industry growth has outpaced the development of education programs, the initiation of formal programs to train qualified personnel should be undertaken with caution. For these reasons, the following recommendations are made:

1. A maximum of three educational programs in telecommunications should be developed at the associate degree level in New Jersey as soon as feasible. These programs should be regional in scope and distributed equitably across New Jersey, i.e., one program each should be located in the northern, central, and southern areas of the State. Each program should be designed initially to graduate a maximum of forty students per year.
2. Due to the high cost of developing such programs, only schools with existing capabilities, i.e., equipped studios and electronics laboratories, should be encouraged to establish programs.

3. Because the ability of graduates to obtain jobs will be directly related to the scope and substance of their educational background, the proposed programs should be designed to provide students with marketable skills in a rapidly changing industry. The programs should be technologically oriented with a strong sequence of electronics courses. Although the technological skills taught should be broadly applicable to both cable and broadcast facilities, the majority of program graduates are likely to find employment in cable television. Therefore, emphasis should be placed on preparation for employment in this field, including hands-on experience in the form of internships in actual job settings. Courses in data processing, marketing, and management should also be available. Curricular flexibility is essential, as technological advances within the industry are occurring at lightning speed.
4. No additional educational programs should be offered in telecommunications at the community college level prior to the completion of follow-up studies of the first cohort of graduates of the three recommended programs. These studies should include statistics on job placement, as well as an analysis of the relationship between the educational preparation of the graduates and their subsequent employment.

APPENDIX

EMPLOYMENT SURVEY INSTRUMENTS

AND

COVER MEMORANDA

State of New Jersey
DEPARTMENT OF ENERGY
BOARD OF PUBLIC UTILITIES
1100 RAYMOND BLVD.
NEWARK, NEW JERSEY 07102

JOHN P. CLEARY
DIRECTOR

OFFICE OF CABLE TELEVISION

December 22, 1980

TO: New Jersey Cable Operators

FROM: John P. Cleary, Director
Office of Cable Television

As you well know, due to the extraordinary growth of cable television in New Jersey and the nation, it is imperative that an efficient work force be trained to cope with the mounting needs of this expansion. I urge you to give the attached survey serious thought because a program such as this conceived by the Department of Higher Education can only serve to better the quality of cable service. This goal is, of course, in the best interests of all of us.

Sincerely,

John P. Cleary
Director

Attachment

New Jersey Is An Equal Opportunity Employer

State of New Jersey
DEPARTMENT OF HIGHER EDUCATION
225 WEST STATE STREET
P. O. BOX 1293
TRENTON, NEW JERSEY 08625

MEMORANDUM

December 3, 1980

TO: General Managers, Cable Television Companies

FROM: Dr. Lewis Dars, Director, Office of Research and Manpower

SUBJECT: Telecommunications Employment Survey

The New Jersey Department of Higher Education is currently exploring regional and statewide needs for personnel with advanced technical skills in telecommunications. The purpose of this study is to establish a data base for considering the feasibility of developing associate degree granting programs in the field of telecommunications at one or more community colleges in the State. The two year program(s) would provide students with the theoretical knowledge and practical skills to:

1. Design and lay out plans for broadcast and cable studios.
2. Troubleshoot, maintain and adjust equipment found in typical broadcast and cable facilities.
3. Maintain cable television and satellite systems.
4. Understand digital technology and applications.
5. Operate microwave transmission facilities.
6. Pass the F.C.C. examination for Radio Telephone 1st Class License.

Your cooperation in completing the enclosed questionnaire as fully and accurately as possible will enable us to determine whether such programs are needed, how many would be appropriate, and where they should be located. As the attached memorandum indicates, the survey has the full support of the New Jersey Office of Cable Television.

All answers will be kept in strictest confidence. Only summarized data based on the information provided will be reported. If you have any questions, please contact Phyllis Denbo of my office at 609/984-6338.

We would appreciate return of the questionnaire by January . Thank you.

Enclosure

New Jersey Is An Equal Opportunity Employer

Telecommunications Employment Survey

General Information

1. Company Name: _____
2. Address: _____
3. Name of person completing this form: _____
4. Title: _____ Telephone: _____
5. Date Questionnaire Completed: _____

Staffing Patterns

6. Please specify total number of employees in your organization: _____
7. Please indicate the number of present and anticipated technical-level employees by job title. (Include studio employees, if appropriate.)

JOB TITLE	# Full-time	# Part-time	Hours Part-time	# Available Positions	Additional Personnel Next 2 yrs.	Additional Personnel Next 5 yrs.
a) Installers						
b) Servicemen						
c) Technicians						
d) Others (please specify)						

8. Please indicate the number of presently employed technical personnel by job title and highest level of training:

JOB TITLE	On the Job Training	Customized Vocational Training (max. 6 mos.)	1 yr. Certificate Program	Assoc. Degree Program	Other (Please specify)
a) Installers					
b) Servicemen					
c) Technicians					
d) Others (please specify)					

9. Do you foresee a need for graduates of a two-year training program in telecommunications with the skills and knowledge described in the attached memorandum? YES_____ NO_____

10. If "yes" to question #9, for what kinds of jobs would you consider a graduate of such a program? Please estimate, to the best of your ability, the number of individuals you might need in each job category listed.

Job Title	# in the Immediate Future	# in 2 years	# in 5 years
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

Services

11. Do you presently have an equipped studio? YES____ NO____

12. Do you originate local programs? YES____ NO____

a) If yes, please estimate current number of hours per week _____; anticipated number of hours per week in 2 years_____; in 5 years _____.

b) If no, do you anticipate offering local programming? YES____ NO_____
If yes, when do you plan to begin?_____

13. Please feel free to make any comments or suggestions about the two year program that you wish in the space below. You may use the reverse side if necessary.

NEW JERSEY BROADCASTERS ASSOCIATION

Representing the Radio and Television Industry in the Garden State

JOHNSTON HALL
RUTGERS-THE STATE UNIVERSITY
NEW BRUNSWICK, NEW JERSEY 08903

ARNOLD L. ZUCKER
Executive Director
Tel. (201) 247-3337

January 21, 1981

TO: New Jersey Broadcasters

FROM: Arnie Zucker, Executive Director

SUBJECT: Department of Higher Education Survey.

The New Jersey Department of Higher Education is currently trying to determine whether or not to authorize programs of study at a number of New Jersey's community colleges which would deal with preparing technicians and engineers for the broadcasting and telecommunications field. Knowing of NJBA stations' needs in this area, we are supporting the Department's efforts in this project.

Toward this end, we would urge your prompt and complete response on the enclosed questionnaire. Examine your need for engineers and technicians, and help our educational system provide for the preparation of such personnel. Remember, by assisting the Department and its efforts we are really assisting ourselves in helping to respond to a current broadcasting need.

State of New Jersey
DEPARTMENT OF HIGHER EDUCATION
225 WEST STATE STREET
P. O. BOX 1293
TRENTON, NEW JERSEY 08625

MEMORANDUM

January 21, 1980

TO: General Managers, Broadcast Stations

FROM: Lewis Dars, Ph.D., Director, Office of Research and Manpower

SUBJECT: Engineering and Technician Employment Survey

The New Jersey Department of Higher Education is currently exploring regional and statewide needs for personnel with advanced technical skills in telecommunications. The purpose of this study is to establish a data base for considering the feasibility of developing associate degree granting programs in the field of telecommunications at one or more community colleges in the State. The two year program(s) would provide students with the theoretical knowledge and practical skills to:

1. Design and lay out plans for radio, television, and cable studios and transmitters.
2. Maintain and operate equipment found in typical broadcast and cable facilities.
3. Maintain and operate satellite and microwave systems.
4. Understand digital technology and applications.
5. Qualify for equivalent of the F.C.C. 1st Class License.

Your cooperation in completing the enclosed questionnaire as fully and accurately as possible will enable us to determine whether such programs are needed, how many would be appropriate, and where they should be located. As the attached memorandum indicates, the survey has the full support of the New Jersey Broadcasters Association.

All answers will be kept in strictest confidence. Only summarized data based on the information provided will be reported. If you have any questions, please contact Phyllis Denbo of my office at 609/984-6388.

A stamped, address envelope is enclosed for your convenience. We would appreciate return of the questionnaire by February 13. Thank you.

Enclosure

New Jersey Is An Equal Opportunity Employer

Engineering and Technician Employment Survey

General Information

1. Company Name: _____

2. Address: _____

3. Name of person completing this form: _____

4. Title: _____ Telephone: _____

5. Date Questionnaire Completed: _____

Staffing Patterns

6. Please specify total number of employees in your organization: _____

7. Please indicate the number of present and anticipated technical-level employees by job title. (Include studio employees.)

JOB TITLE	# Full-time	# Part-time	Hours Part-time	# Available Positions	Additional Personnel Next 2 yrs.	Additional Personnel Next 5 yrs.
a) First Class Engineers	____	____	____	_____	_____	_____
b) Technicians	____	____	____	_____	_____	_____
c) Other (please specify)						
_____	____	____	____	_____	_____	_____

8. Please indicate the number of presently employed technical personnel by job title and highest level of training:

JOB TITLE	On the Job Training	Customized Vocational Training (max.6 mos.)	1 yr. Certificate Program	Assoc. Degree Program	Baccalaureate Degree Program
a) First Class Engineers	_____	_____	_____	____	_____
b) Technicians	_____	_____	_____	____	_____
c) Other (please specify)					
_____	_____	_____	_____	____	_____

9. Do you foresee a need for graduates of a two-year training program in telecommunications with the skills and knowledge described in the attached memorandum? YES_____ NO_____

10. If "yes" to question #9, for what kinds of jobs would you consider a graduate of such a program? Please estimate, to the best of your ability, the number of individuals you might need in each job category listed.

Job Title	# in the Immediate Future	# in 5 years
_____	_____	_____
_____	_____	_____
_____	_____	_____

11. Please feel free to make any comments or suggestions about the two year program that you wish in the space below. You may use the reverse side if necessary.

MANPOWER PUBLICATIONS OF THE OFFICE OF RESEARCH AND MANPOWER

MANPOWER PLANNING SERIES

1. An Analysis of the Need for Registered Nurses in New Jersey: 1979-1990, ORM Volume 1: Report Number 1, July 1980

2. An Inventory of Health Professions Education Programs in New Jersey: 1977-1982, ORM Volume 1: Report Number 2, December 1980

3. An Analysis of the Need for Medical Record Administration Programs in New Jersey, ORM Volume 1: Report Number 3, February 1981

4. Conducting a Labor Market Analysis: A Manual, ORM Volume 1: Report Number 4, May 1981

5. An Analysis of the Need for Practitioners of Mortuary Science in New Jersey, ORM Volume 1: Report Number 5, May 1981

6. Telecommunications: A Labor Market Analysis, ORM Volume 1: Report Number 6, June 1981